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Psychological impact of the COVID-19 outbreak on students in a French region severely affected by the disease: results of the PIMS-CoV 19 study

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1. Background

Coronavirus disease 2019 (COVID-19), which was first identified in Wuhan city in East China in December 2019 (Zhu et al., 2019), has spread at an alarming rate and become a major challenging global public health problem (Phelan et al., 2020). In response to this pandemic situation, the World Health Organization (WHO) declared a public health emergency of international concern on January 30, 2020 (WHO, 2020). Although the mortality rate of COVID-19 outside China was initially rather low (Kang, 2020), leading to the expectation that the effect of the disease on the health of individuals in other countries would be minor, this view rapidly changed. In France, the most recent reports of laboratory-confirmed COVID-19 cases and deaths are as follows: through July 15, 2020, a total of 174 674 patients were diagnosed with confirmed cases, of whom 30 152 died due to COVID-19 and 79 244 recovered and were discharged from hospitals. Since March 15, 2020, some unprecedented measures have been adopted in France with the intention of controlling COVID-19 transmission and avoiding contact with others. As in many countries, officials with the French government have announced the closure of schools, colleges, universities and other educational institutions to prevent the rapid spread of COVID-19 by disrupting important chains of transmission (Sahu, 2020).

According to monitoring by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the closure of educational institutions impacted over 87% of the student population worldwide (De Oliveira et al., 2020). Students, as well as universities, became uncertain about how online teaching would be delivered, such as the procedures for assessments, projects and semester-end final examinations (Sahu, 2020). This situation has created a sense of uncertainty, stress and anxiety that might lead to unfavourable outcomes regarding the psychological health of students (Al-Rabiaah et al.,

2020). Several other measures were also implemented, including travel restrictions, social distancing, and closures of restaurants, movie theatres, gyms, museums, and other places involving potential gatherings, leading students to protect themselves from any person-to-person contact and to live in self-isolation until the situation became normal. Based on a number of recent studies, students have been identified as a vulnerable group that experiences significant levels of stress-related mental health concerns, including anxiety and depression (Regehr et al., 2013). Thus, before the pandemic started, one in five college students worldwide had experienced one or more diagnosable mental disorders (Auerbach et al., 2016; Zhai et al., 2020). According to previous research, individuals experience negative emotional responses, such as anxiety and depression symptoms, during an outbreak (Zhou et al., 2020), and stressful events and public health emergencies such as the COVID-19 outbreak are potent adverse environmental factors that may exert greater psychological effects on students that are expressed as anxiety, fear and worry [Mei et al., 2011; Liu et al., 2020; Fiorillo et al., 2020). A recent study among Chinese college students revealed that 24.9% experienced anxiety because of this COVID-19 outbreak. Overall, living in urban areas, living with parents and having a steady family income were identified as protective factors against anxiety in college students, while having a relative or an acquaintance infected with COVID-19 was an independent risk factor for experienced anxiety (Cao et al., 2020). Similarly, a study reported increased scores for anxiety, depression, and suicidal thoughts, worsened quality of life and decreased quality of sleep among Greek students during the lockdown (Kaparounaki et al., 2020).

Based on this recent literature on the psychological impacts of the epidemic among students and because the Grand Est region was one of the three French regions that was most severely affected by the COVID-19 outbreak, the students from this area

may be at particular risk of developing severe mental health issues. Thus, to evaluate their mental health and to understand student needs in order to develop interventions, this study aimed to assess the prevalence rate of anxiety and determine which sociodemographic, living conditions and health status characteristics could predict anxiety among French students during the lockdown due to the COVID-19 outbreak.

2. Methods

2.1. Study design and population

This study is a cross-sectional analysis of data from the Feelings and Psychological Impact of the COVID-19 epidemic among Students in the Grand Est area (PIMS-CoV19) study, an observational study that was conducted through an online survey. The online questionnaire was accessible from May 7 to May 17, 2020 and each participant had the opportunity to complete it only once. Twenty minutes were required to complete the survey. A sample of students was recruited from the University of Lorraine and the Sciences Po College located in Nancy, Lorraine, Grand Est region, France. The Grand Est Region was an area that ranked among the French regions that was most substantially affected by COVID-19 in terms of the incidence of COVID-19 cases, with 19.6 cases per 100 000 inhabitants during the period of the survey.

All students received detailed information regarding the purpose of the study and provided online informed consent to participate in the study. The survey was completed anonymously to ensure the confidentiality and reliability of the data. All procedures were conducted in accordance with the principles of the Declaration of Helsinki.

When the study was launched, it targeted the entire student population in Lorraine, i.e. more than 50 000 students. We had estimated that 5-10% of the students would respond

to the survey, i.e., between 2 500 and 5 000 students. No prior sample size calculation was performed.

2.2. Data collection

The survey consisted of three sections: questions regarding sociodemographic data and living conditions during the lockdown, concerns regarding the threat to health posed by COVID-19 and control measures, and health status measures assessed with self-administered questionnaires. All data were obtained at the time of the online survey.

2.2.1. Anxiety symptoms

The 7-item Generalized Anxiety Disorder Scale (GAD-7) was used to assess anxiety symptoms. It includes seven items based on seven core symptoms, and the participants were asked how often they were bothered by each symptom during the last two weeks (Spitzer et al., 2006). Each item was rated on a 4-point Likert scale ranging from 0 “not at all” to 3 “nearly every day” such that the total score ranged from 0 to 21. It is currently the most widely used anxiety measure, both in clinical practice and research (Toussaint et al., 2020). The scores for symptom severity were 5-9 for mild anxiety, 10-14 for moderate anxiety, and 15-21 for severe anxiety (Spitzer et al., 2006). The French version of the GAD-7 was used, as it has yielded valid clinical assessments of anxiety. A good internal consistency with Cronbach's alpha coefficient of 0.898 was previously established, and good external validity has been confirmed (Micoulaud-Franchi et al., 2016). The scale has been used in many studies to assess anxiety symptoms in students (Musiat et al., 2014; Kayotaki et al., 2019; Cao et al., 2020).

2.2.2. Self-perceived social support

The 12-item Multidimensional Scale of Perceived Social Support (MSPSS) was used to assess social support from three sources: family, friends and significant others (Zimet et al., 1988). The students were asked to indicate their level of agreement with each item on a 7-point Likert scale ranging from 1 “very strongly disagree” to 7 “very strongly agree.” The total score of each dimension and the total scored range from 1 to 7, with higher scores indicating higher perceived social support. The French version of the MSPSS has proven to have good psychometric properties. Good internal reliability and reproducibility were previously established (Denis et al., 2015). The original version yields valid clinical assessments of perceived social support among students (Dahlem et al., 1991).

2.2.3. Sociodemographic data and other characteristics

The students self-reported their demographic characteristics, including age, gender, living arrangements, home location and academic demographic information, such as academic programme and scholarship status. They were also asked about their living and learning conditions, changes in their consumption of psychoactive substances, their preventive behaviours regarding COVID-19 and the presence of a relative or acquaintance infected with COVID-19.

2.3. Statistical analyses

2.3.1. Descriptive analyses

Continuous variables were described by the mean and standard deviation or the median, as appropriate, and categorical variables by percentages.

2.3.2. Bivariate and multivariate analyses

A logistic regression analysis was performed to determine the variables associated with moderate to severe anxiety. The probability modelled was a GAD-7 score higher than 10 (Spitzer et al., 2006). Sociodemographic characteristics, learning and teaching conditions, the influence of living conditions, concerns regarding the health threat posed by COVID-19 and self-perceived social support scores were investigated. Relevant factors were identified as factors that were associated in the bivariate analysis at the 10% threshold. The suitability of the full model was evaluated and compared with a model to which a stepwise selection of candidate variables was applied using a significance level entry of 0.1 and a significance level stay of 0.05. The goodness of fit was assessed by calculting the model determination coefficient (R2), and the Hosmer and Lemeshow test allowed the comparison and selection of the best multivariable model. Only significant factors at the 5% threshold in the level models were retained for multivariable analyses. Analyses were performed using SAS 9.4 software (SAS Inst., Cary, NC, USA).

3. Results

3.1. Student characteristics

As shown in Table 1, 3 936 students were recruited in the PIMS-CoV19 study, more than two-thirds of whom were women (70.6%). The mean and median ages were 21.7 (SD=4) and 21 years old, respectively. Among the sample, 67.5% of students lived with their parents, while 18.7% lived alone and 7.7% lived in colocation during the lockdown. More than half lived (59.3%) in urban areas, and 60.1% had a domestic garden that provided the opportunity for students to have immediate outside contact. One-quarter of the students (28.3%) experienced conflicts within the housing where they were confined, and 25.1% found it difficult to isolate themselves in the dwelling. The largest group of

participants were students of the faculties of sciences, including sport sciences, science and technology and medical sciences (57.9%), followed by students in the faculties of law, economy and management (14.1%). Due to disruptions in the academic routine, one-third of the students (36.2%) received total online teaching. The time working at home did not change for 29.2% of the students. For 13.4% of the students, the pandemic had a serious impact due to the postponement of a final examination. Of the 3 936 students, 40.7% received a financial aid programme as scholarship students and 14.4% had their student part-time job end during the lockdown, in addition to their interrupted studies. One-third of the participants (34.5%) had a relative or acquaintance who was infected with COVID-19, and 4.3% had someone in their housing infected with COVID-19.

3.2. Student behaviours

As shown in Table 2, seventeen percent of the students (17.7%) reported consuming drinks two or more times per week before the lockdown. Under the lockdown, thirteen percent (13.7%) reported consuming more alcohol and 35% reported consuming less alcohol. Tobacco use increased for 7.2% of the students. More than three-quarters of the students (84.7%) adopted daily preventive behaviours regarding COVID-19 in their housing location. As shown in Table 3, media entertainment was largely successfully used by students rather than physical exercise and reading as a means to relieve their distress and address their concerns regarding the negative conditions they were experiencing.

3.3. Levels of anxiety and social support during the lockdown

The GAD-7 results are presented in Table 4. The mean GAD-7 score was 6.7 (SD=5.0). The rate of mild anxiety was 36%, and the rates of moderate and severe anxiety were

15.2% and 9.8%, respectively. The proportion of all of the students with mild-to-severe anxiety symptoms was 61%. The mean MSPSS total score was 5.5 (SD=1.1). The mean scores for support from family, friends and significant others were 5.2 (SD=1.5), 5.5 (SD=1.3) and 5.7 (SD=1.3), respectively.

3.4. Factors associated with moderate to severe anxiety

The results of bivariate and multivariable analyses are reported in Table 5. Among the sociodemographic variables, female gender was a risk factor for anxiety symptoms (OR=2.2, 95% CI: 1.8-2.7, p<0.0001). Regarding academic programmes, being engaged in arts, humanities, and languages was a risk factor for anxiety (OR=1.8, 95% CI: 1.4-2.4, p=0.0004). Among the learning conditions, the delay of final examinations (OR=1.6, 95% CI: 1.3-2.1, p<0.0001) and the reduced time for learning due to academic disruption (OR=1.3, 95% CI: 1.1-1.6, p=0.031) were found to be risk factors for anxiety symptoms. In terms of living conditions during the lockdown, the results indicated that many factors were associated with anxiety during the COVID-19 crisis: tensions and conflicts with family or occupants of the dwelling (OR=1.8, 95% CI: 1.5-2.1, p<0.0001), difficulties in being able to isolate in the housing location (OR=1.4, 95% CI: 1.1-1.6, p=0.0015), indoor noise in the housing location (OR=1.6, 95% CI: 1.3-1.9, p<0.0001), noise outside the housing location (OR=1.5, 95% CI: 1.3-1.8, p<0.0001) and no private direct access to outside through a garden, a terrace or a balcony (OR=1.6, 95% CI: 1.3-2.0, p=0.0006). In terms of student behaviours, increased tobacco consumption was a risk factor for anxiety symptoms (OR=1.9 95% CI: 1.4-2.6, p=0.0002). The self-perceived ineffectiveness of both media entertainment (OR=2.2, 95% CI: 1.1-4.4, p=0.0006) and reading (OR=1.9, 95% CI: 1.3-2.7, p<0.0001) to calm down were risk factors for anxiety. However, when reading was perceived as an effective means to calm down, it was a protective factor

against anxiety (OR=0.7, 95% CI: 0.6-0.97, p<0.0001). Regarding snacking, the greater the extent snacking was perceived as an effective means to calm down, the higher the risk of anxiety symptoms (OR=1.9, 95% CI 1.4-2.5, p=0.0002). Family support (OR=0.85, 95% CI: 0.80-0.90, p<0.0001) and friend support (OR=0.88, 95% CI: 0.82-0.94, p<0.0001) were protective factors against anxiety symptoms. Having someone in their housing affected by COVID-19 was the highest risk factor for anxiety symptoms (OR=3.3, 95% CI: 1.4-7.9, p=0.0006).

4. Discussion

Important to the primary aim of this study was the finding that 61% of students in the sample experienced anxiety during the lockdown due to the COVID-19 outbreak. This result is well above the value of 24.9% of Chinese students from Changzhi Medical College who were afflicted with experienced anxiety (Cao et al., 2020) and the 22.1% of medical students enrolled at Tongji Medical College who experienced anxiety during the COVID-19 outbreak quarantine period (Liu J et al., 2020). Based on our results, the psychological impact of the disease on the student population in a French area that was particularly affected by COVID-19 is significant. This high prevalence might be explained by an online assessment during a period when the period of isolation had lasted for more than one month and was prolonged by the government. In addition to the high infectivity and French mortality rate of COVID-19 relayed daily by the French media, the consequences of the prolongation of isolation in their homes might induce more anxiety among the students. This result highlights the students' perceptions of the serious threat at the peak phase of the COVID-19 pandemic and seriously contrasts with the low anxiety levels in the French population during the A/H1N1 influenza pandemic (Schwarzinger et al., 2010; Bults et al., 2015). The results of this study also indicated that several

characteristics were associated with students' moderate to severe anxiety. Among the sociodemographic characteristics, female gender was associated with a higher level of anxiety during the COVID-19 outbreak, which differed from a previous study indicating that male and female students experienced similar levels of stress and negative emotions as a result of the epidemic (Cao et al., 2020). However, our result was consistent with a previous study conducted during the epidemic reporting that female gender was the highest risk factor for anxiety among Chinese high school students (Zhou et al., 2020). The delay of a final examination and being in the arts, humanities and languages academic programmes were also significant factors contributing to students' experienced anxiety during the COVID-19 crisis. This result might be explained by the difficulties associated with teaching some courses, such as fine arts, art, and music, online, as previously suggested (Sahu, 2020), and supports the need for a method by which students receive regular information about competitions, exams or assessment deadlines through university intranets during the outbreak. Furthermore, several characteristics of the students' living conditions were associated with student anxiety. In contrast to previous findings, students living in rural areas were not more likely to be anxious (Zhou et al., 2020; Cao et al., 2020), but students without private outside access (terrace, garden, or balcony) were more likely to be anxious. Nevertheless, the lack of private direct outside access through a terrace or a balcony might be explained by the economic resources of the students. Although many of them made a lifestyle change during the lockdown by returning to their home with their parents, living with parents was not found to be a significant factor contributing to reduced anxiety, as previously reported (Cao et al., 2020). Regardless of the place of residence, conflicts at home, difficulties isolating themselves and noisy environments added to students' anxiety. Similarly, students using self-perceived inefficient strategies to calm down were most likely to be anxious. These

environmental factors highlighted by this study support the need to develop behavioural strategies that focus on relaxation exercises and activity scheduling (home-based exercises) to counteract anxiety in the home environment (Wang et al., 2020). Consistent with previous findings, social support reduced psychological pressure and appeared to be a protective factor against anxiety, as anxiety disorders are known to be more likely to occur in the absence of interpersonal communication (Jin et al., 2014; Chen et al., 2020). Increased cigarette smoking was associated with students' anxiety symptoms. The factors underlying this association are still being discussed with two types of hypotheses. One is that anxious individuals are at an elevated risk of smoking due to the presumed calming effects of smoking (Kassel et al., 1997). Another is that cigarette smoking contributes to the development of anxiety disorders due to factors such as the presumed anxiogenic effects of nicotine (Pohl et al., 1992). However, the results of a prospective study have shown that cigarette smoking might increase the risk of anxiety disorders during late adolescence and early adulthood (Johnson et al., 2000). As expected, because it has been noted as an important variable in the literature (Wang et al., 2020), having relatives or acquaintances at home who are infected with COVID-19 and subsequently hospitalized were clearly the main risk factors for increasing the anxiety of the students, which might be related to the high contagiousness of the disease (WHO, 2020). Based on this result, effective and robust support is necessary for the family or indivdiduals in a close environment with an infected person during public health emergencies. It contributes to evidence that social support and psychological interventions are needed to decrease the anxiety of students when a relative is infected and hospitalized with COVID-19.

The results from this study should be interpreted in light of a number of strengths and limitations. First, the representativeness of the sample is limited, as it is a sample of voluntary participants, which may have led to an over-evaluation of anxiety. Second, the

greater proportion of female students may have limited the representativeness. Third, the students were recruited from one of the French areas that was the most substantially affected by COVID-19, thereby limiting the generalizability of these results to all students. Fourth, the data were collected using electronic self-report questionnaires, which may have excluded persons without internet access and which, although anonymous, may introduce bias-specific to socially desirable responses. Finally, despite the large number of determinants included in the analyses, the multivariate model explained 25% of the explained variance; thus, other factors, such as anxiety due to media coverage and daily accurate information regarding the infection rates and number of deaths, were not accounted for by our study and should be included in future studies. However, this study provides invaluable information on the anxiety of students in a French area particularly affected by COVID-19. Our results bring attention to the interesting findings that health initiatives for students should include improvements in learning and living environments. Simply developing resources to facilitate online guidance and lectures to offer strategies for managing anxiety and building a campus environment that offers access to a private outside space for the students are essential, as these actions might result in mental health benefits.

Based on the findings of the present study, more than half of the students in a French area particularly affected by COVID-19 experienced anxiety during the lockdown due to the COVID-19 outbreak. Although the virus continues to circulate, the epidemic is under control in France. However, it is still spreading elsewhere, and recommendations are needed in preparation for a possible second wave. The female gender, having a relative or an acquaintance at home infected with COVID-19 and some living conditions were the main factors associated with higher levels of anxiety. Several key messages should be

highlighted based on these findings. First, the government should focus more on psychological health among students while combating COVID-19. Then, the results provide some novel information that identifies high-risk groups among students and promotes specific and effective interventions aimed at this particular group, thus providing potential psychological benefits.

Patient and public involvement

All students received detailed information describing the purpose of the study and provided online informed consent to participate in the study. The survey was anonymously to ensure the confidentiality and reliability of the data. All procedures were conducted in accordance with the principles of the Declaration of Helsinki.

Contributors: SB-B, CB, MB and CT conceptualised the project and conducted the search with input from KL and HR. All authors were involved in data extraction and validation. HR analysed the data with support from CB. SB-B and CB interpreted the data with support from HR. SB-B wrote the first draft of the manuscript. All authors were involved in editing and approving the manuscript. The corresponding author attests that all listed authors meet the authorship criteria and that no other authors meeting the criteria have been omitted. SB-B and CB serve as guarantors.

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Tables

Table 1. Sociodemographic and living characteristics of the study sample during the lockdown (N = 3936)

	Full sample	
	N	%/mean (SD)
Characteristic		
Age	3928	21.7 (4.0)
Gender		
Male	1154	29.4
Female	2771	70.6
Living arrangements		
Alone	544	13.8
With spouse only	477	12.1
With parents	2576	65.5
With spouse and children	99	2.5
With friends	189	4.8
Others	45	1.3
Financial aid programme		
None	2334	59.3
Scholarship	1602	40.7
Home location		
Urban area	2318	59.3
Rural area	1590	40.7
Access to a private outside space		
No access	671	17.1
Private balcony, courtyard or terrace	607	15.5
Private domestic garden	2353	60.1
Courtyard or garden for collective use	285	7.3
Difficulty isolating at home		
Yes	987	25.1
No	2949	74.9
Tensions and conflicts at home		
Yes	1115	28.3
No	2821	71.7
Noises outside the housing		
Yes	920	23.4
No	3016	76.6
Noises inside the housing		
Yes	783	19.9
No	3153	80.1
Student part-time job		
None	2741	69.6
Activity interrupted during the lockdown	565	14.4
Activity increased during the lockdown	304	7.7
No change during the lockdown	326	8.3
Someone at home infected with COVID-19		
No	3322	84.4
Confirmed and hospitalized cases	27	0.7
Confirmed and non-hospitalized cases	142	3.6
Suspected cases	445	11.3
Relative or acquaintance infected with COVID-19		
No	1951	49.5
Confirmed and hospitalized cases	472	12.0
Confirmed and non-hospitalized cases	884	22.5
Suspected cases	629	16.0

Abbreviation: SD, standard deviation

Table 2. Learning conditions and lifestyles of the study sample during the lockdown

	Full sample N = 3936	
	N	%
Learning conditions		
Academic programme		
Sport, medical sciences, science and technology	2278	57.9
Law, economics, management	688	17.5
Arts, humanities, languages	337	8.6
Social and human sciences	630	16.0
Online teaching delivery		
None	811	20.6
Partial online teaching	1701	43.2
Total online teaching	1424	36.2
Time working at home		
No change	1148	29.2
Increased time working	787	20.0
Reduced time working	2001	50.8
Postponement of final examination (Yes)	529	13.4
Lifestyles		
Alcohol consumption		
None	1346	34.2
No change	672	17.1
Increased consumption	539	13.7
Reduced consumption	1378	35.0
Tobacco consumption		
None	3283	83.5
No change	117	3.0
Increased consumption	282	7.2
Reduced consumption	252	6.3
Preventive behaviours at home regarding COVID-19		
None	3332	84.7
Yes	604	15.3

Table 3. Means used by students to mitigate anxiety during the COVID-19 lockdown

Option	Not used	Ineffective 1	2	3	4	Very effective 5
Media entertainment, %	2.0	5.9	11.2	22.0	26.3	32.6
Reading entertainment, %	22.7	5.3	13.9	18.7	20.5	18.8
Physical exercise, %	17.0	5.1	10.8	16.5	20.3	30.3
Snacking between meals, %	24.1	11.7	19.5	18.8	13.7	12.2

Table 4. Anxiety and social support scores during the lockdown

		Full sample N = 3936
	N	%/Mean (SD)
GAD-7 score		
Normal (0-4)	1533	38.9
Mild anxiety (5-9)	1418	36.0
Moderate anxiety (10-14)	598	15.2
Severe anxiety (15-21)	387	9.8
MSPSS-total score	3869	5.5 (1.1)
MSPSS-subscales		
Family	3869	5.2 (1.5)
Friend	3869	5.5 (1.3)
Significant other	3869	5.7 (1.3)

Abbreviation: SD, standard deviation; GAD-7, 7-item Generalized Anxiety Disorder Scale; MSPSS, Multidimensional Scale of Perceived Social Support

Table 5. Factors associated with moderate to severe anxiety during COVID-19 lockdown (N= 3776)

	Bivariate regression analysis			Multivariate logistic regression analysis R^2= 0.25, H&L=0.86		
	OR	**95% CI**	***P-value***	**OR**	**95% CI**	***P-value***
Gender (female vs male)	2.5	2.1-3.0	<0.0001	**2.2**	1.8-2.7	<0.0001
Age (ref: <median age)	0.9	0.7-1.0	0.043			
Home location (ref: urban vs rural area)	1.1	0.9-1.3	0.30			
Financial aid programme (ref: scholarship vs none)	1.2	1.0-1.4	0.02			
Access to a private outside space			<0.0001			0.0006
Private domestic garden	1			1		
Private balcony, courtyard or terrace	1.2	1.0-1.5		1.2	0.9-1.5	
Courtyard or garden for collective use	1.2	0.9-1.6		1.3	0.9-1.8	
No access	1.6	1.3-1.9		**1.6**	1.3-2.0	
Difficulty isolating at home (Yes vs No)	2.5	2.1-2.9	<0.0001	**1.4**	1.1-1.6	0.0015
Tensions and conflicts at home (Yes vs No)	2.8	2.4-3.2	<0.0001	**1.8**	1.5-2.1	<0.0001
Noises outside the housing (Yes vs No)	2.2	1.8-2.5	<0.0001	**1.5**	1.3-1.8	<0.0001
Noises inside the housing (Yes vs No)	2.8	2.4-3.4	<0.0001	**1.6**	1.3-1.9	<0.0001
Someone at home infected with COVID-19 (ref: no)			<0.0001			0.0006
Confirmed and hospitalized cases	3.5	1.6-7.5		**3.3**	1.4-7.9	
Confirmed and non-hospitalized cases	1.7	1.2-2.4		1.8	1.2-2.7	
Suspected cases	1.5	1.2-1.9		1.3	1.0-1.7	
Relative or acquaintance infected with COVID-19 (ref: no)			<0.0001			
Confirmed and hospitalized cases	1.8	1.4-2.2				
Confirmed and non-hospitalized cases	1.3	1.1-1.5				
Suspected cases	1.5	1.2-1.8				

Abbreviations: OR, odds ratio: the probability of GAD-7 score >7; OR<1, decreased frequency of GAD-7 score > 7; OR>1, increased frequency of GAD-7 score > 7; SD, standard deviation; MSPSS, Multidimensional Scale of Perceived Social Support

Table 5. (continuation) Factors associated with moderate to severe anxiety during COVID-19 lockdown (N= 3776)

	Bivariate regression analysis			Multivariate logistic regression analysis R^2= 0.25, H&L=0.86		
	OR	**95% CI**	***P-value***	**OR**	**95% CI**	***P-value***
Academic programme (ref: Sport, med. sciences, science and technology)			<0.0001			0.0004
Law, economics, management	1.3	1.1-1.6		1.2	0.9-1.5	
Arts, humanities, languages	2.3	1.8-2.9		**1.8**	1.4-2.4	
Social and human sciences	1.6	1.3-1.9		1.2	0.96-1.5	
Online teaching delivery (ref: none)			0.025			
Partial online teaching	1.0	0.8-1.2				
Total online teaching	0.8	0.7-1.0				
Time working at home (ref: no change)			<0.0001			0.031
Increased time working	1.3	1.0-1.6		1.1	0.9-1.5	
Reduced time working	1.6	1.4-2.0		1.3	1.1-1.6	
Postponement of final examination (Yes vs No)	1.6	1.3-1.9	<0.0001	**1.6**	1.3-2.1	<0.0001
Alcohol consumption (ref: none)			<0.0001			
No change	0.8	0.7-1.0				
Increased consumption	1.4	1.1-1.7				
Reduced consumption	0.8	0.6-0.9				
Tobacco consumption (ref: none)			<0.0001			0.0002
No change	1.0	0.7-1.6		1.1	0.7-1.7	
Increased consumption	2.3	1.8-3.0		**1.9**	1.4-2.6	
Reduced consumption	1.0	0.7-1.3		0.9	0.6-1.3	
MSPSS-subscales						
Family	0.7	0.7-0.8	<0.0001	**0.85**	0.80-0.91	<0.0001
Friend	0.8	0.7-0.8	<0.0001	**0.88**	0.82-0.94	<0.0001
Significant other	0.9	0.8-0.9	<0.0001			
Media entertainment (ref: not used) ¥			<0.0001			0.0006
1-Ineffective	3.0	1.6-5.6		**2.2**	1.1-4.4	
Reading entertainment (ref: not used) ¥			<0.0001			<0.0001
1-Ineffective	2.4	1.7-3.3		**1.9**	1.3-2.7	

Physical exercise (ref: not used) ¥			<0.0001			0.0044
5- very effective	0.5	0.4-0.7		**0.7**	0.5-0.9	
Snacking between meals (ref: not used) ¥			<0.0001			0.0002
4-effective	2.0	1.6-2.6		**1.5**	1.1-2.0	
5- very effective	2.5	1.9-3.2		**1.9**	1.4-2.5	

Abbreviations: OR, odds ratio: the probability of GAD-7 score >7; OR<1, decreased frequency of GAD-7 score > 7; OR>1, increased frequency of GAD-7 score > 7; SD, standard deviation; MSPSS, Multidimensional Scale of Perceived Social Support

¥ For these variables, the p-value is for global comparison of each modality of effectiveness, as shown in Table 3 vs not used, but only significant ORs (95% CIs) are shown.